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EXAMINER	
THOMAS, MIA M	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/518,253	LESELLIER, ESTELLE	
	Examiner	Art Unit	
	Mia M. Thomas	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 June 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to applicant's remarks/discussion of issues received on 05 June 2008. Claims 1-20 are pending in this application. Claims 10-20 are newly added; claim 8 is amended to be an independent claim. No new matter is added, and the intended scope of the claims is not reduced.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 9 recites the limitation "computer medium" at line 9. There is insufficient antecedent basis for this limitation in the claim. The specification of this instant application is not supported by the term "computer medium".

Claim Rejections - 35 USC § 101

4. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

> When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare In re Lowry, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and Warmerdam, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with Warmerdam, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).
>
> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See Lowry, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

5. Claim 9 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 9 defines a computer program embodying functional descriptive material. However, the claim does not define a computer-readable medium or computer-readable memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). The scope of the presently claimed invention encompasses products that are not necessarily computer readable, and thus NOT able to impart any functionality of the recited program. The examiner suggests amending the claim(s) to embody the program on "computer-readable medium" or equivalent; assuming the specification does NOT define the computer readable medium as a "signal", "carrier wave", or "transmission medium" which are deemed non-statutory (refer to "note" below). Any amendment to the claim should be commensurate with its corresponding disclosure.

Note:

> A "signal" (or equivalent) embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

Should the full scope of the claim as properly read in light of the disclosure encompass non-statutory subject matter such as a "signal", the claim as a whole would be non-statutory. In the case where the specification defines the computer readable medium or memory as statutory tangible products such as a hard drive, ROM, RAM, etc, as well as a non-statutory entity such as a "signal", "carrier wave", or "transmission medium", the examiner suggests amending the claim to *include* the disclosed tangible computer readable media, while at the same time *excluding* the intangible media such as signals, carrier waves, etc.

6. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

> Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.
>
> … a signal does not fall within one of the four statutory classes of Sec. 101.
>
> … signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

7. Claim 9 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 9 defines a "data carrier", for example a disc and a "form of a downloadable signal" with descriptive material. While "functional descriptive material" may be claimed as a statutory product (i.e., a "manufacture") when embodied on a

tangible computer readable medium, a "data carrier" embodying that same functional descriptive material is neither a process (i.e., a series of steps per se.) nor a product (i.e., a tangible "thing") and therefore does not fall within one of the four statutory classes of § 101. Rather, "signal" is a form of energy, in the absence of any physical structure or tangible material.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-3, 5-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drouot et al. (WO 01/120912 A1) in combination with Mancuso et al. (US 6,285,801 B1).

Regarding Claim 1: (Previously presented) Drouot teaches a method of processing data corresponding to pixels of a sequence of digital images so as to detect a grid corresponding to blocking artifacts ("The present invention relates to a method for detecting blocking artifacts in digital video pictures." at abstract; also refer to Figure 3 and Figure 1), comprising: high-pass filtering a portion of a digital image to supply at least one set of discontinuity pixels (Refer to Figure 1, Element GF and further page 4, lines 8-10) detecting blocking artifacts from the at least one set of discontinuity pixels (Refer to Figure 1, Element CALC and further at page 4, lines 11-35);

Drouot does not expressly teach searching rows within the portion for, a grid row having a density of blocking artifacts that is substantially larger than that of its neighboring rows.

Mancuso teaches searching, within said portion (Refer to Figure 1, numeral 104, further at column 3, line 12-30+), a set of grid rows (Refer to Figure 2; ""Presented herein is a system and method to reduce blocking artifacts that overcome the limitations associated with image compression standards. An example embodiment stores several rows of an image to be processed in line memories." at column 1, line 54), a grid row having a density of blocking artifacts which is *substantially larger than* that of its neighboring rows (For example, see Figure 4, further at column 5, line 8; "The image rows contain a target pixel as well as pixels neighboring the target pixel. This exemplar extracts global metrics from the image, estimates local metrics related to the target pixel and the neighboring pixels as local metrics, uses fuzzy logic to determine the number of pixels to be processed, determines the difference in gray level values between the target pixel and the neighboring pixels, and smoothes any abrupt transitions in gray levels from the target pixel to neighboring pixels using a dual ramp generator." at column 1, line 58).

Drouot and Mancuso are combinable because they are in the same field of signal processing and filtering noise such as blocking artifacts in digital images (see title of each invention).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to describe a step of searching, within said portion a set of grid rows a grid row having a density of blocking artifacts which is *substantially larger than* that of its neighboring rows.

The suggestion/motivation for combining Drouot with the teaching of Mancuso would have been to because "the image can be scanned sequentially row-by row (or line by line) as a stream of

pixels into the filter." at column 2, line 65 (Mancuso). The searching capabilities of the Global Metrics Extractor (numeral 104) would allow a more efficient search of the grid rows and streaming of the pixels into the filter.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the disclosure of Drouot with the teachings of Mancuso to obtain the invention as specified in Claim 1.

Regarding Claim 2: (Currently amended) ~~A data processing method as claimed in~~ Mancuso teaches wherein the searching includes:

selecting, in a row of the portion of the image, segments comprising a number of consecutive blocking artifacts that is larger than a predetermined first threshold (Refer to Figure 3, numeral 304(processing window). For clarity, ("FIG. 3 illustrates one image block 202 partitioned into several pixels, wherein a pixel is designated by 302. A target pixel 302i, i.e., the pixel to be processed using the filter 100, and neighboring pixels are defined by a sub-block of the image 100, called a processing window 304." at column 4, line 4); Another example would be at Figure 4, numeral 404, refer to column 4,line 62;

computing a blocking artifact level per row on the basis of values of pixels of the selected segments ("Recall that depending on the compression ratio used in the images the effects of block coding the image become visible around the block boundaries. When the image signal is encoded in intra-field mode, the macro-block will contain pixels belonging to only one field, and the blocking artifact will affect the border of an 8*8 pixel sub-block." at column 6, line 4; further

at Figure 12); Specifically, Figure 4, numeral 402 is a "processing window in which the blocking artifacts may become visible at numeral 404, or at numeral 504 (Figure 5)." at column 4, line 62).

determining a grid row on the basis of a comparison of the blocking artifact levels of a current row and a set of neighboring rows (Refer to Figures 5, numerals 506 and 504).

Regarding Claim 3: (Currently amended) Drouot teaches including measuring the image quality by adding the blocking artifact levels of the different rows of the grid for the portion of the image (Refer to page 2, lines 3-9).

Regarding Claim 5 (Currently amended): Drouot teaches the high-pass filtering supplies two sets of discontinuity pixels, one horizontal set and one vertical set (Refer to page 4, lines 8- 10).

Regarding Claim 6 (Currently amended): Drouot teaches detecting the blocking artifacts includes detecting a first type of blocking artifacts and a second type of blocking artifacts from the at least one set of discontinuity pixels (Refer to page 5, line 22-page 6, line 3).

Regarding Claim 7 (Currently amended): Drouot teaches correcting the blocking artifacts situated in the grid rows in accordance with their type (p1, p2) (Refer to Fig 1 Element PP, page 4 lines 31 through page 5 lines 1-2 and Page 2 Lines 22-28).

Regarding Claim 9 (Previously presented): Mancuso teaches a computer medium that includes program product comprising a set of instructions which, when loaded into a circuit, cause said circuit to perform the method of processing digital images as claimed in claim 1 (Refer to

column 11, lines 7-22; specifically, "The filter implemented using hardware, software or a combination of hardware and software, and may be implemented in a computer system or other processing system.")

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Drouot et al. (WO 01/120912 A1) in combination with Mancuso et al. (US 6,285,801 B1) as applied to claim rejections above, and further in view of Jung et al. (US 6,822,675 B2).

Regarding Claim 4 (Currently amended):

Drouot and Mancuso in combination teaches all the claimed elements as listed above.

Drouot and Mancuso in combination does not specifically teach validating *to* determine whether a grid is present within the portion of the digital image if the number of grid rows found in said portion is higher than a second predetermined threshold.

Jung teaches validating *to* determine whether a grid is present within the portion of the digital image if the number of grid rows found in said portion is higher than a second predetermined threshold ("A corner outlier is detected by taking into account: an absolute luminance difference between a candidate corner pixel and the average of the group of four neighboring corner pixels to which it belongs, a perceptual visibility of that difference given the local average luminance, a probability that the candidate pixel is a natural pixel simply aligned with the grid. Verification of corner outlier metric performance is straightforward, as corner outliers are usually few and highly visible. Further at column 7, lines 60-67 and column 8, lines 1-13 for more detailed explanations of the step of validation).

Drouot, Mancuso and Jung are combinable because they are in the same field of blocking artifacts in digital videos and digital video image quality. (See title of each invention).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to validate to determine whether a grid is present within the portion of the digital image if the number of grid rows found in said portion is higher than a second predetermined threshold.

The suggestion/motivation for this combination would have been to provide a precise metric and also a false detection rate which is analogous with the blocking artifacts. The efficiency and effectiveness of this validation is greatly affected and thus the validation step as taught by Jung is necessary for the best method for carrying out the specifics of this manipulation of the video image elements. Specifically, "Nevertheless, each of the first three impairment metrics presented so far incorporates a simple implementation of Weber's law in order to account for perceptual visibility, plus empirical thresholds to separate natural image content from artifacts. As it has been said before, other impairments may be added without departing from the scope of the invention. For example, in addition to the set of impairment metrics presented above, noise and blur/sharpness can make the set complete enough for practical applications." at column 8, line 14 (Jung).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the disclosure of the combination of Drouot and Mancuso with the teachings of Jung to obtain the specified invention of Claim 4.

12. Claims 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6,950,473 B2) in combination with Mancuso et al. (US 6,285,801 B1) and Drouot et al. (WO 01/120912 A1).

Regarding Claim 8: (Currently amended) Kim teaches a television receiver (Refer to Figure 9) and a display [of] corrected digital images on ~~a~~ the screen ~~of said receiver.~~ (Refer to Figure 9, numeral 99, 101, respectively)

Mancuso teaches a screen that includes pixels arranged in rows ("An MPEG-2 standard has been developed to accommodate relatively high resolution, high-bit rate image sequences of the type generally used for full screen playback, such as in entertainment systems, web browsers, television (TV), high-definition TV (HDTV), or with image games played on personal computers (PCs)." at column 1, line 26)

search rows within the portion (Refer to Figure 1, numeral 104, further at column 3, line 12-30+; Refer to Figure 2; ""Presented herein is a system and method to reduce blocking artifacts that overcome the limitations associated with image compression standards. An example embodiment stores several rows of an image to be processed in line memories." at column 1, line 54), for a grid row having a density of blocking artifacts that is substantially larger than that of its neighboring rows (For example, see Figure 4, further at column 5, line 8; "The image rows contain a target pixel as well as pixels neighboring the target pixel. This exemplar extracts global metrics from the image, estimates local metrics related to the target pixel and the neighboring pixels as local metrics, uses fuzzy logic to determine the number of pixels to be processed, determines the difference in gray level values between the target pixel and the

neighboring pixels, and smoothes any abrupt transitions in gray levels from the target pixel to neighboring pixels using a dual ramp generator." at column 1, line 58).

correct the blocking artifacts situated in the grid row to provide a corrected digital image ~~said rows,~~ (Refer to column 10, line 29-45);

Drouot teaches and ~~a~~ processing device ~~using the data processing method as claimed in claim 7, for detecting the grid rows within a sequence of digital images, correcting~~ that is configured to (Refer to page 1, lines 7-9); high-pass filter a portion of a digital image to supply at least one set of discontinuity pixels (Refer to Figure 1, Element GF and further page 4, lines 8-10)

detect blocking artifacts from the at least one set of discontinuity pixels (Refer to Figure 1, Element CALC and further at page 4, lines 11-35);

All of the claimed elements were known in the prior art at the time of the invention. One skilled in the art could have combined the elements of Kim, Mancuso and Drouot as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one or ordinary skill in the art at the time of the invention.

The motivation/suggestion for doing so would have been to create a more efficient and cost effective television receiver that would exemplify an image processing device to accurately and precisely detect blocking artifacts.

Therefore, at the time that the invention was made, it would have been obvious to combine the teachings of Kim, Mancuso and Drouot to obtain the specified claimed elements of Claim 8.

Regarding Claim 10: (New) Drouot teaches the processor is configured to detect a first type of blocking artifact and a second type of blocking artifact from the at least one set of discontinuity pixels (Refer to page 5, line 22-page 6, line 3).

Regarding Claim 11: (New) Drouot teaches the processor is configured to correct the blocking artifacts situated in the grid rows based on the type of blocking artifact (Refer to Fig 1 Element PP, page 4 lines 31 through page 5 lines 1-2 and Page 2 Lines 22-28).

Regarding Claim 12: (New) Mancuso teaches the processing device is configured to:

select, in a row of the portion of the image, segments comprising a number of consecutive blocking artifacts that is larger than a predetermined first threshold(Refer to Figure 3, numeral 304(processing window). For clarity, ("FIG. 3 illustrates one image block 202 partitioned into several pixels, wherein a pixel is designated by 302. A target pixel 302i, i.e., the pixel to be processed using the filter 100, and neighboring pixels are defined by a sub-block of the image 100, called a processing window 304." at column 4, line 4); Another example would be at Figure 4, numeral 404, refer to column 4,line 62;

compute a blocking artifact level per row based on values of pixels of the selected segments ("Recall that depending on the compression ratio used in the images the effects of block coding the image become visible around the block boundaries. When the image signal is encoded in intra-field mode, the macro-block will contain pixels belonging to only one field, and the blocking artifact will affect the border of an 8*8 pixel sub-block." at column 6, line 4; further at Figure 12);

Specifically, Figure 4, numeral 402 is a "processing window in which the blocking artifacts may become visible at numeral 404, or at numeral 504 (Figure 5)." at column 4, line 62).

and determine the grid row based on a comparison of the blocking artifact levels of a current row and a set of neighboring rows (Refer to Figures 5, numerals 506 and 504).

13. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6,950,473 B2) in combination with Mancuso et al. (US 6,285,801 B1) and Drouot et al. (WO 01/120912 A1) and further in view of Jung et al. (US 6,822,675 B2).

Regarding Claim 13: (New) Kim, Mancuso and Drouot in combination teaches all the claimed elements as listed above.

Kim in combination with Mancuso and Drouot does not specifically teach a validation system that is configured to validate a presence of the grid row by comparing a total number of grid rows found to a threshold value

Jung teaches a validation system that is configured to validate a presence of the grid row by comparing a total number of grid rows found to a threshold value ("A corner outlier is detected by taking into account: an absolute luminance difference between a candidate corner pixel and the average of the group of four neighboring corner pixels to which it belongs, a perceptual visibility of that difference given the local average luminance, a probability that the candidate pixel is a natural pixel simply aligned with the grid. Verification of corner outlier metric performance is straightforward, as corner outliers are usually few and highly visible. Further at column 7, lines 60-67 and column 8, lines 1-13 for more detailed explanations of the step of validation).

Kim, Drouot, Mancuso Jung are combinable because they are in the same field of blocking artifacts in digital videos and digital video image quality. (See title of each invention).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to utilize a validation system that is configured to validate a presence of the grid row by comparing a total number of grid rows found to a threshold value

The suggestion/motivation for this combination would have been to provide a precise metric and also a false detection rate which is analogous with the blocking artifacts. The efficiency and effectiveness of this validation is greatly affected and thus the validation step as taught by Jung is necessary for the best method for carrying out the specifics of this manipulation of the video image elements. Specifically, "Nevertheless, each of the first three impairment metrics presented so far incorporates a simple implementation of Weber's law in order to account for perceptual visibility, plus empirical thresholds to separate natural image content from artifacts. As it has been said before, other impairments may be added without departing from the scope of the invention. For example, in addition to the set of impairment metrics presented above, noise and blur/sharpness can make the set complete enough for practical applications." at column 8, line 14 (Jung).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of the combination of Kim, Mancuso and Drouot with the teachings of Jung to obtain the specified invention of Claim 13.

14. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6,950,473 B2) in combination with Mancuso et al. (US 6,285,801 B1) and Drouot et al. (WO 01/120912 A1) and further in view of Astle (US 5,590,064)

Regarding Claim 14: (New) Kim, Mancuso and Drouot in combination teaches all the claimed elements as rejected above. Kim, Mancuso and Drouot in combination does not specifically disclose that the processing device includes: a plurality of discrete cosine transforms that are arranged to identify one or more frequency limits associated with the grid row and a correction unit that is configured to substantially reduce elements of the digital image that exceed these one or more frequency limits to form the corrected digital image.

Astle teaches the processing device includes: a plurality of discrete cosine transforms that are arranged to identify one or more frequency limits associated with the grid row (Refer to the abstract; specifically, "Encoded video signals comprise sets of transform coefficients (e.g., DCT coefficients) corresponding to different regions of a video frame. An inverse transform is applied to sets of transform coefficients to generate decoded regions of a decoded video frame."; "In a preferred embodiment, the dead-band filter is based on a weighted sum, where low-frequency DCT coefficients are weighted more heavily than high-frequency DCT coefficients." at column 8, line 11);

and a correction unit that is configured to substantially reduce elements of the digital image that exceed these one or more frequency limits to form the corrected digital image ("In a preferred embodiment, the transform coefficients are DCT coefficients and the DC and first two AC DCT coefficients are sequentially adjusted to correct for quantization errors in the encoding process." at abstract; further refer to column 24, line 19).

Kim, Mancuso, Drouot and Astle are combinable because they are in the same field of image enhancement/restoration with respect to filtering to minimize discontinuities at boundaries of image blocks with respect to television motion detection. (See title, abstract and classification of each invention.)

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to process a plurality of DCT's that are arranged to identify one or more frequency limits associated with a grid row and to utilize a correction unit that is configured to reduce elements of the digital image that exceed the aforementioned frequency limits to form a corrected digital image.

The suggestion/motivation for processing a plurality of discrete cosine transforms would have been "For intra blocks, the DCT coefficients are further encoded using run-length encoding and variable-length encoding. For inter blocks, DCT coefficient differences are generated based on the DCT coefficients for the current block and DCT coefficients corresponding to the corresponding block of the previous frame. These DCT coefficient differences are then further encoded using run-length encoding and variable-length encoding. In conventional video encoding, inter blocks are encoded based on the differences between corresponding pixel values of successive video frames. As such, conventional video encoding permits motion estimation and motion compensation to be included in the video encoding and decoding processes. In the present invention, however, inter blocks are encoded based on the differences between corresponding DCT coefficients of successive video frames." at column 3, line 20, Astle.

The suggestion/motivation for utilizing a correction unit would have been "the transform coefficients are DCT coefficients and the DC and first two AC DCT coefficients are sequentially adjusted for quantization errors in the encoding process." at abstract, Astle.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Astle in combination with Kim, Mancuso and Drouot to obtain the specified claimed elements of Claim 14.

15. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6,950,473 B2) in combination with Mancuso et al. (US 6,285,801 B1) and Drouot et al. (WO 01/120912 A1) and further in view of Astle (US 5,590,064)

Regarding Claim 15: (New) Kim teaches a display system (Refer to Figure 9, numeral 99, and numeral 101) comprising:

a display screen that includes pixels arranged in rows (Refer to Figure 9, numeral 101, also refer to column 12, lines 35-49),

Mancuso teaches a detector that is configured to search rows within the portion for a grid row having a density of blocking artifacts that is substantially larger than that of its neighboring rows (Refer to Figure 3, numeral 304(processing window). For clarity, ("FIG. 3 illustrates one image block 202 partitioned into several pixels, wherein a pixel is designated by 302. A target pixel

302i, i.e., the pixel to be processed using the filter 100, and neighboring pixels are defined by a sub-block of the image 100, called a processing window 304." at column 4, line 4); Another example would be at Figure 4, numeral 404, refer to column 4,line 62;

Drouot teaches a high-pass filter that is configured to filter a portion of a digital image to supply at least one set of discontinuity pixels (Refer to Figure 1, Element GF and further page 4, lines 8-10)

Astle teaches a correction system that is configured to correct the blocking artifacts situated in the grid row to provide a corrected digital image for display on the display screen ("In a preferred embodiment, the transform coefficients are DCT coefficients and the DC and first two AC DCT coefficients are sequentially adjusted to correct for quantization errors in the encoding process." at abstract; further refer to column 24, line 19; also Figure 1, numeral 100- "Each PC system 100 may optionally display the locally generated video signals as well as the decompressed remote video signals, preferably in separate windows on the monitor 106." at column 4, line 7).

Kim, Mancuso, Drouot and Astle are combinable because they are in the same field of image enhancement/restoration with respect to filtering to minimize discontinuities at boundaries of image blocks with respect to television motion detection. (See title, abstract and classification of each invention.)

All of the claimed elements were known in the prior art at the time of the invention. One skilled in the art could have combined the elements of Kim, Mancuso, Drouot and Astle as claimed by

known methods with no change in their respective functions, and the combination would have yielded predictable results to one or ordinary skill in the art at the time of the invention.

The motivation/suggestion for doing so would have been to create a more efficient and cost effective display system that would exemplify an image processing device to accurately and precisely detect blocking artifacts.

Therefore, at the time that the invention was made, it would have been obvious to combine the teachings of Kim, Mancuso, Drouot and Astle to obtain the specified claimed elements of Claim 15.

Regarding Claim 16: (New) Mancuso teaches the detector is configured to: select, in a row of the portion of the image, segments comprising a number of consecutive blocking artifacts that is larger than a predetermined first threshold (Refer to Figure 3, numeral 304(processing window). For clarity, ("FIG. 3 illustrates one image block 202 partitioned into several pixels, wherein a pixel is designated by 302. A target pixel 302i, i.e., the pixel to be processed using the filter 100, and neighboring pixels are defined by a sub-block of the image 100, called a processing window 304." at column 4, line 4); Another example would be at Figure 4, numeral 404, refer to column 4,line 62;

compute a blocking artifact level per row based on values of pixels of the selected segments; ("Recall that depending on the compression ratio used in the images the effects of block coding the image become visible around the block boundaries. When the image signal is encoded in intra-field mode, the macro-block will contain pixels belonging to only one field, and the blocking

artifact will affect the border of an 8*8 pixel sub-block." at column 6, line 4; further at Figure 12); Specifically, Figure 4, numeral 402 is a "processing window in which the blocking artifacts may become visible at numeral 404, or at numeral 504 (Figure 5)." at column 4, line 62). determine the grid row based on a comparison of the blocking artifact levels of a current row and a set of neighboring rows (Refer to Figures 5, numerals 506 and 504).

16. Claims 17 -20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6,950,473 B2) in combination with Mancuso et al. (US 6,285,801 B1) and Drouot et al. (WO 01/120912 A1) and further in view of Astle (US 5,590,064) and Jung et al. (US 6,822,675 B2).

Regarding Claim 17: (New)

Kim, Mancuso, Drouot and Astle in combination teaches all the claimed elements as listed above.

Kim in combination with Mancuso, Drouot and Astle does not specifically teach a validation system that is configured to validate a presence of the grid row by comparing a total number of grid rows found to a threshold value

Jung teaches a validation system that is configured to validate a presence of the grid row by comparing a total number of grid rows found to a threshold value ("A corner outlier is detected by taking into account: an absolute luminance difference between a candidate corner pixel and the average of the group of four neighboring corner pixels to which it belongs, a perceptual visibility of that difference given the local average luminance, a probability that the candidate pixel is a natural pixel simply aligned with the grid. Verification of corner outlier metric performance is straightforward, as corner outliers are usually few and highly visible. Further at

column 7, lines 60-67 and column 8, lines 1-13 for more detailed explanations of the step of validation).

Kim, Drouot, Mancuso, Astle and Jung are combinable because they are in the same field of blocking artifacts in digital videos and digital video image quality. (See title of each invention).

At the time that the invention was made, it would have been obvious to one of ordinary skill in the art to utilize a validation system that is configured to validate a presence of the grid row by comparing a total number of grid rows found to a threshold value

The suggestion/motivation for this combination would have been to provide a precise metric and also a false detection rate which is analogous with the blocking artifacts. The efficiency and effectiveness of this validation is greatly affected and thus the validation step as taught by Jung is necessary for the best method for carrying out the specifics of this manipulation of the video image elements. Specifically, "Nevertheless, each of the first three impairment metrics presented so far incorporates a simple implementation of Weber's law in order to account for perceptual visibility, plus empirical thresholds to separate natural image content from artifacts. As it has been said before, other impairments may be added without departing from the scope of the invention. For example, in addition to the set of impairment metrics presented above, noise and blur/sharpness can make the set complete enough for practical applications." at column 8, line 14 (Jung).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of the combination of Kim, Mancuso, Drouot and Astle with the teachings of Jung to obtain the specified invention of Claim 17.

Regarding Claim 18: (New) Jung teaches a validation system that is configured to validate a presence of the grid row by comparing a total number of grid rows found to a threshold value ("A corner outlier is detected by taking into account: an absolute luminance difference between a candidate corner pixel and the average of the group of four neighboring corner pixels to which it belongs, a perceptual visibility of that difference given the local average luminance, a probability that the candidate pixel is a natural pixel simply aligned with the grid. Verification of corner outlier metric performance is straightforward, as corner outliers are usually few and highly visible. Further at column 7, lines 60-67 and column 8, lines 1-13 for more detailed explanations of the step of validation).

Regarding Claim 19: (New) Astle teaches the correction system includes:
a plurality of discrete cosine transforms that are arranged to identify one or more frequency limits associated with the grid row (Refer to the abstract; specifically, "Encoded video signals comprise sets of transform coefficients (e.g., DCT coefficients) corresponding to different regions of a video frame. An inverse transform is applied to sets of transform coefficients to generate decoded regions of a decoded video frame."; "In a preferred embodiment, the dead-band filter is based on a weighted sum, where low-frequency DCT coefficients are weighted more heavily than high-frequency DCT coefficients." at column 8, line 11); and

a correction unit that is configured to substantially reduce elements of the digital image that

exceed these one or more frequency limits ("In a preferred embodiment, the transform coefficients are DCT coefficients and the DC and first two AC DCT coefficients are sequentially adjusted to correct for quantization errors in the encoding process." at abstract; further refer to column 24, line 19).

Regarding Claim 20: (New) Astle teaches the correction unit includes: a filter that is configured to substantially eliminate components of an output of at least one of the discrete cosine transforms corresponding to frequencies above the one or more frequency limits to form a filtered transform ("Encoded video signals comprise sets of transform coefficients (e.g., DCT coefficients) corresponding to different regions of a video frame. The discontinuities for boundaries between adjacent regions are used to adjust one or more of the transform coefficients. The adjusted sets of transform coefficients are then used to generate filtered regions of a filtered video frame corresponding to the decoded video frame. In a preferred embodiment, the transform coefficients are DCT coefficients and the DC and first two AC DCT coefficients are sequentially adjusted to correct for quantization errors in the encoding process.), and an inverse discrete cosine transform that is configured to convert the filtered transform into at least a portion of the corrected digital image." at abstract); an inverse discrete cosine transform that is configured to convert the filtered transform into at least a portion of the corrected digital image ("An inverse transform is applied to the first set of transform coefficients to generate a decoded first region of a decoded video frame." at column 1, line 64).

Response to Arguments

17. Applicant's arguments filed 05 June 2008 have been fully considered but they are not persuasive. With respect to the 103(a) rejection over Drouot (WO 01/20912) in combination with Mancuso (6,285,801) at page 7 of 10;

In summary: Drouot and Mancuso fails to teach detecting blocking artifacts from a set of discontinuity pixels and searching rows for a grid row having a density of blocking artifacts that is substantially larger than that of its neighboring rows, as specifically claimed in each of the independent claims 1 and 8.

Examiner's Response: The Examiner disagrees.

With respect to **("detecting blocking artifacts from a set of discontinuity pixels")** Drouot clearly teaches ("The present invention relates to a method for detecting blocking artifacts in digital video pictures." at abstract; also refer to Figure 3 and Figure 1). The Examiner is not relying solely on the limitation as taught by Drouot to teach the entire claimed limitations of Claim 1, however the Examiner is relying on the combination of Drouot and Mancuso to exemplify that the claimed elements of Claim 1 is unpatentable in view of the combination of Drouot and Mancuso.

Also with respect to **("detecting blocking artifacts from a set of discontinuity pixels")** as stated at column 1, line 54, Mancuso teaches "Presented herein is a system and method to reduce blocking artifacts that overcome the limitations associated with image compression standards. An example embodiment stores several rows of an image to be processed in line memories."

Further Mancuso also teaches with respect to **("a grid row having a density of blocking artifacts which is *substantially larger than* that of its neighboring rows")**

Cited above and cited in the previous Office Action: Figure 4, further at column 5, line 8; "The image rows contain a target pixel as well as pixels neighboring the target pixel. This exemplar extracts global metrics from the image, estimates local metrics related to the target pixel and the neighboring pixels as local metrics, uses fuzzy logic to determine the number of pixels to be processed, determines the difference in gray level values between the target pixel and the neighboring pixels, and smoothes any abrupt transitions in gray levels from the target pixel to neighboring pixels using a dual ramp generator." at column 1, line 58).

The global metric from the image is related to the pixel data which has to be searched or registered to some form of memory to detect a blocking artifact. Since Mancuso teaches a global metric identification, this claimed element more than reasonably teaches that it is configured to, capable of, etc of determining and or to seek out or pursue the density of blocking artifacts that are substantially larger than that of its neighboring rows. Since the teachings of Mancuso states at column 1, line 56, the digital signal processing stores several rows of an image to be processed in line memories, it is obvious that in that storage, there is a reasonable expectation that the storage of the elements to be processed with also incur a search of blocking artifacts as stated at column 1, line 59-67; "This exemplar extracts global metrics from the image, estimates local metrics related to the target pixel and the neighboring pixels as local metrics, uses fuzzy logic to determine the number of pixels to be processed, determines the difference in gray level values between the target pixel and the neighboring pixels, and smoothes any abrupt transitions in gray levels from the target pixel to neighboring pixels using a dual ramp generator."

Therefore, the rejection of Claim 1 is proper and is unpatentable over Drouot in view of Mancuso (prior art made of reference). The rejection of claim 1 stands.

Examiner's Response to Claim 8 (see above arguments for Claim 1): Similarly, Claim 8 has claimed limitations that mirror some of those of Claim 1. The Examiner does not agree with the applicant's remarks. The claimed elements of Claim 8 have been amended by way of this response to the Office Action of 5 March 2008. Claim 8 currently stands rejected by Kim (US 6,950,473 B2) in combination with Mancuso et al. (US 6,285,801 B1) and Drouot et al. (WO 01/120912 A1).

Therefore, the rejection of Claim 8 also stands.

Summary of Remarks: See page 8 of 10. Claim 4 is dependent on Claim 1. Drouot and Mancuso fails to teach or suggest each of the elements of Claim 1. Accordingly, the rejection Claim 4 should be withdrawn.

Examiner's Response: The Examiner disagrees. The Examiner has maintained the grounds of rejection with respect to Claim 1 and therefore, maintains the rejection of Claim 4.

Summary of Remarks: "The Office Action asserts that "computer medium" in claim 9 lacks antecedent basis. The Rejection of Claim 9 under 35 U.S.C. 112, second paragraph, for failing to provide an antecedent basis for a computer medium is unfounded an should be reversed.

Examiner's Response: Applicant's arguments with respect to the rejection of Claim 9 under 112, 2nd paragraph have been fully considered but they are not persuasive.

Under careful consideration of this rejection the Examiner quotes from the previous Office Action that "6. Claim 9 recites the limitation "computer medium" at line 9. There is insufficient antecedent basis for this limitation in the claim. *The specification of this instant application is not supported by the term "computer medium".*

The Examiner understands that the "indefinite article "A'" necessarily and sufficiently provides a basis for the term "computer medium", however, that was not the basis upon which the Examiner relied on this rejection. The rejection was forwarded because there is no recitation of a "computer medium" in the specification. At paragraph [0045], the specification only recites "a computer program and a "data carrier", etc which is not the same as a computer medium. Further limitations of the specification cannot be read into the claims. The specification is recorded for written support of the applicant's claimed invention. The rejection of Claim 9 under 35 U.S.C 112, second paragraph stands.

Summary of Remarks: "The Office Action asserts that "claim 9 defines a "data carrier" for example, a disc and a "form of a downloadable signal" with descriptive material. The applicant respectfully disagrees with this assertion."

Examiner's Response: Applicant's arguments with respect to 101 rejections have been fully considered but are moot in view of new grounds of rejection.

The Examiner does agree that MPEP 2101.06 recites that functional descriptive material that is recorded on computer-readable medium is statutory, because the use of this material permits the function of the material to be realized.

The recitation of Claim 9 does not state “a computer readable medium”. Further at paragraph [0045], “The computer program may also be loaded into the programming memory for reading a data carrier such as, for example, a disc comprising said program. The reading operation may also be performed by means of a communication network such as, for example, the Internet. In this case, the service provider will put the computer program in the form of a downloadable signal at the disposal of those interested.” The support of these claimed elements clearly state that the computer program does not reside on a “computer readable medium” and that a "downloadable signal” is considered a signal claim. Therefore, Claim 9 is non-statutory and a new rejection under 101 is forwarded with this response. The rejection of Claim 9 stands.

Conclusion

18. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mia M. Thomas whose telephone number is (571)270-1583. The examiner can normally be reached on Monday-Thursday 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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